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(71) Applicant *(for all designated States except US)*: **DEUTSCHES INSTITUT FÜR ERNÄHRUNGSFORSCHUNG** [DE/DE]; Arthur-Scheunert-Allee 114-116, 14558 Bergholz-Rehbrücke (DE).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **BUFE, Bernd** [DE/DE]; Beelitzer Strasse 33H, 14548 Ferch (DE). **HOFMANN, Thomas** [DE/DE]; Tischlerweg 5, 48161 Münster-Roxel (DE). **KRAUTWURST, Dietmar** [DE/DE]; Am Rehgraben 25, 14558 Bergholz-Rehbrücke (DE). **KUHN, Christina** [DE/DE]; Am Nuthetal 5, 14558 Bergholz-Rehbrücke (DE). **MEYERHOF, Wolfgang** [DE/DE]; Schubertring 27, 22848 Norderstedt (DE).

(74) Agents: **KRAUSS, Jan, B.** et al.; Boehmert & Boehmert, Pettenkoferstrasse 20-22, 80336 München (DE).

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(54) Title: BITTER TASTE RECEPTORS

(57) Abstract: The present invention relates to novel bitter taste receptors and corresponding agonists as well as processes employing these bitter taste receptors in processes directed at the identification of antagonists and agonists.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/10691

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/12 C12N15/11 C07K14/705 C07K16/28 C12Q1/68
G01N33/50 A01K67/027 A61K38/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12N C07K C12Q G01N A01K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, BIOSIS, MEDLINE, EMBASE, Sequence Search, EMBL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/77676 A (SENOMYX INC) 18 October 2001 (2001-10-18) see SEQ ID NO: 1 and 2 (pp. 70 and 71) page 1 - page 15; claims 1-3,36-39,45-50,60,76-87,93,97,98,101-104 page 26 - page 28 -----	1-23
P,X	BUFE BERND ET AL: "The human TAS2R16 receptor mediates bitter taste in response to beta-glucopyranosides" NATURE GENETICS, vol. 32, no. 3, November 2002 (2002-11), pages 397-401, XP002269573 ISSN: 1061-4036 the whole document -/--	1-5, 7-13, 19-23

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 February 2004	14 05. 2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Oderwald, H

Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	-& DATABASE EMBL [Online] EBI; 29 April 2002 (2002-04-29), BUFE B ET AL: "Homo sapiens candidate receptor TAS2R38 gene" XP002269574 Database accession no. AF494231 abstract -----	1-5,9-12
A	MARGOLSKEE ROBERT F: "Molecular mechanisms of bitter and sweet taste transduction" JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 277, no. 1, 4 January 2002 (2002-01-04), pages 1-4, XP002254829 ISSN: 0021-9258 cited in the application the whole document -----	1-23
A	CHANDRASHEKAR J ET AL: "T2Rs function as bitter taste receptors" CELL, CELL PRESS, CAMBRIDGE, NA, US, vol. 100, no. 6, 17 March 2000 (2000-03-17), pages 703-711, XP002216268 ISSN: 0092-8674 cited in the application the whole document -----	1-23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 03/10691

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: (16, 17, 19-23 partially)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-23 (partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: (16, 17, 19-23 partially)

Present claims 16 and 17 relate to an extremely large number of possible compounds/products. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds/products claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the agonists 'acetylurea, ..., and 2-thiouracil' mentioned in table VI on pages 48 and 49 of the description.

Present claims 19-23 relate to an extremely large number of possible compounds/products. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds/products claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the compounds/products 'antibody', 'inhibiting RNA', 'receptor fragment which binds bitter substances' as mentioned in the description at page 15, line 26 - page 16, line 9.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-23 all partially

A polynucleotide SEQ ID NO: 1 encoding polypeptide SEQ ID NO: 2 (hTAS2R38). Vectors, hosts, transgenic animals, processes for producing a polypeptide or a cell, polypeptide (SEQ ID NO: 2), antibodies, antagonists/inhibitors, processes for isolating a binding compound or an antagonist, processes for the production of food or a nutraceutical or pharmaceutical, uses for the manufacture of a medicament.

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2. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 3 and 4 (hTAS2R39).

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3. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 5 and 6 (hTAS2R40).

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4. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 7 and 8 (hTAS2R41).

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5. claims: 1-23 all partially

same as invention 1, but comprising SEQ ID NO: 9 and 10 (hTAS2R43).

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6. claims: 1-23 all partially

same as invention 1, but comprising SEQ ID NO: 11 and 12 (hTAS2R44).

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7. claims: 1-23 all partially

same as invention 1, but comprising SEQ ID NO: 13 and 14 (hTAS2R45).

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8. claims: 1-23 all partially

same as invention 1, but comprising SEQ ID NO: 15 and 16 (hTAS2R46).

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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9. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 17 and 18 (hTAS2R47).

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10. claims: 1-23 all partially

same as invention 1, but comprising SEQ ID NO: 19 and 20 (hTAS2R48).

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11. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 21 and 22 (hTAS2R49).

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12. claims: 1-17, 19-23 all partially

same as invention 1, but comprising SEQ ID NO: 23 and 24 (hTAS2R50).

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13. claims: 14-17, 19, 20 all partially

Processes for isolating a compound that binds to a polypeptide with SEQ ID NO: 26 (hTAS2R1) encoded by a polynucleotide with SEQ ID NO: 25. Processes for isolating an antagonist. Processes for the production of food and nutraceuticals.

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14. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 27 and 28 (hTAS2R4).

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15. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 29 and 30 (hTAS2R5).

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16. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 31 and 32 (hTAS2R7).

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17. claims: 14-17, 19, 20 all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

same as invention 13, but comprising SEQ ID NO: 33 and 34 (hTAS2R8).

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18. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 35 and 36 (hTAS2R9).

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19. claims: 14-20 all partially

same as invention 13, but comprising SEQ ID NO: 37 and 38 (hTAS2R10).

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20. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 39 and 40 (hTAS2R13).

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21. claims: 14-20 all partially

same as invention 13, but comprising SEQ ID NO: 41 and 42 (hTAS2R14).

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22. claims: 14-20 all partially

same as invention 13, but comprising SEQ ID NO: 43 and 44 (hTAS2R16).

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23. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 45 and 46 (hTAS2R3).

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24. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 47 and 48 (hTAS2R42).

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25. claims: 14-17, 19, 20 all partially

same as invention 13, but comprising SEQ ID NO: 49 and 50 (hTAS2R60).

INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/EP 03/10691

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0177676 A	18-10-2001	AU 5125801 A	23-10-2001
		CA 2403003 A1	18-10-2001
		CN 1434921 T	06-08-2003
		DE 1292827 T1	15-04-2004
		EP 1292827 A1	19-03-2003
		JP 2003530098 T	14-10-2003
		NO 20024809 A	09-12-2002
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		US 2002094551 A1	18-07-2002